

Name:

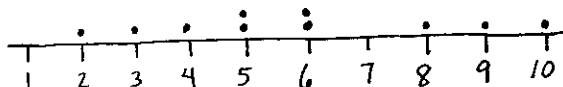
Date:

PBHL 5013/BIOM 5013 – Collected Homework  
Chapters 1, 2, 3

## 1. Answer to 2.3.

- a. Find  $\bar{x}$  = 5.8  
 b. Find the Median = 5.5      2, 3, 4, 5, 5, 6, 6, 8, 9, 10  
 c. Based on the results of parts a and b, are the measurements symmetric or skewed?  
Skewed (to the right)

Draw a dotplot below.



## 2. Answer to 2.16.

Given the sample  $X = \{3, 1, 5, 6, 4, 4, 3, 5\}$ , compute the following.

- a. Calculate the sample range = 5  
 b. Calculate the sample mean = 3.875  
 c. Calculate the sample variance  $\approx$  2.4107  
 Calculate the sample standard deviation  $\approx$  1.5526  
 d. Compare the range and the standard deviation. The range is approximately how many standard deviations = 3.2

3. Answer to 2.28.       $\bar{x} = 4.58571429$   
                                   $s = 2.89173163$

- a. Find the percentage of measurements in interval  $\bar{x} \pm s \approx$  61.4%       $\bar{x} \pm s \Rightarrow (1.69, 7.48)$   
 b. Find the percentage of measurements in interval  $\bar{x} \pm 2s =$  100%       $\bar{x} \pm 2s \Rightarrow (-1.20, 10.37)$   
 c. Find the percentage of measurements in interval  $\bar{x} \pm 3s =$  100%       $\bar{x} \pm 3s \Rightarrow (-4.09, 13.26)$

- d. How do percentages compare with those given by Empirical Rule? Should they be approximately the same? Explain. They differ from those given in the Empirical Rule. No, they should not be approximately the same because the distribution of these data is relatively "flat" rather than approximately mound-shaped.

#### 4. Answer to 2.42.

Given the sample  $X = \{8, 7, 1, 4, 6, 6, 4, 5, 7, 6, 3, 0\}$ , compute the following.

- a. Five number summary:

$$\begin{aligned} \text{Min} &= 0 \\ \text{Q1} &= 3.25 \\ \text{Median} &= 5.5 \\ \text{Q3} &= 6.75 \\ \text{Max} &= 8 \end{aligned}$$

$$3 + 0.25(4-3) = 3.25$$

$$0, 1, 3, 4, 4, 5, 6, 6, 6, 7, 7, 8$$

$$6 + 0.75(7-6) = 6.75$$

$$\text{IQR} = 3.5$$

b.  $\bar{x} = 4.75$   
 $s \approx 2.454$

c. Z score for smallest observation:  $\approx -1.94$

$$z = \frac{0 - 4.75}{2.454124543} \approx -1.94$$

Z score for largest observation:  $\approx 1.32$

$$z = \frac{8 - 4.75}{2.454124543} \approx 1.32$$

Is either unusually large, unusually small? No, neither one is unusually large or unusually small because neither one exceeds 2 in absolute value.

#### 5. Answer to 2.44.

Construct a boxplot for these data and identify any outliers:  $X = \{25, 22, 26, 23, 27, 26, 28, 18, 25, 24, 12\}$

12, 18, 22, 23, 24, 25, 25, 26, 26, 27, 28

$$Q_1 = 22$$

$$\text{median} = 25$$

$$Q_3 = 26$$

$$\text{IQR} = 26 - 22 = 4$$

$$\text{Lower fence: } Q_1 - 1.5(\text{IQR}) = 16$$

$$\text{Upper fence: } Q_3 + 1.5(\text{IQR}) = 32$$

Outlier: 12

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